

REMARKS

Claims 1-15 are all of the claims presently pending in the application. Claims 1, 4 and 5 have been merely editorially amended and have not been substantively amended to more particularly describe the claimed invention. Claims 6-15 have been added to provide more varied protection for the claimed invention and to claim additional features of the invention.

It is noted that the claims amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims, or for any statutory requirements of patentability. Further Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 1-5 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Claims 1-5 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Okaniwa et al. (U.S. Patent No. 6,444,621; hereinafter "Okaniwa"), in view of Tanaka et al. (U.S. Patent No. 6,500,787) (hereinafter "Tanaka").

I. THE CLAIMED INVENTION

The claimed invention (e.g., as defined by exemplary claim 1) is directed to an electric power steering device for transmitting a rotation of a motor for assisting operation of steering which is reduced via a reduction gear to a steering mechanism. The steering device includes a male type joint member and a female type joint member that are jointed to each other for transmitting the rotation of the motor to the reduction gear and a lubricant including a grease, a base oil of the grease having a kinetic viscosity of 1000 to 5000 mm²/s at 40°C, a worked

penetration of which is not more than 300, and which is charged between the male type joint member and the female type joint member.

In conventional electric power steering devices, the rotary shaft of the motor and the worm shaft may be connected by a joint having a male joint member and a female joint member. It is common to charge grease of low viscosity (i.e., 100 to 300 mm²/s at 40°C) into the engagement portion of the male and female joint members. However, when using the low viscosity grease, gear noise may be generated in the engagement portion.

To prevent the generation of gear noise, O-rings may be inserted into the engagement portion. However, when an O-ring is used, the number of parts is increased. Accordingly, productivity of the electric power steering device is deteriorated.

The claimed invention of exemplary claim 1, on the other hand, provides an electric power steering device including a lubricant including a grease, a base oil of the grease having a kinetic viscosity of 1000 to 5000 mm²/s at 40°C, a worked penetration of which is not more than 300, and which is charged between the male type joint member and the female type joint member (e.g., see Application at page 3, line 20 through page 4, line 5). This combination of features is important for providing an electric power steering device where the O-ring is omitted, so that the productivity can be enhanced, while maintaining an excellent high temperature working property and preventing gear noise (see Application at page 3, lines 11-18).

II. THE 35 U.S.C. § 112, SECOND PARAGRAPH, REJECTION

Claims 1-5 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Applicants have amended claims 1, 4 and 5, to more clearly define the claimed

invention.

Specifically, claim 1 (and somewhat similarly claims 4 and 5) has been amended to recite “a grease including a base oil having”. As indicated by the Examiner, it is the base oil of the grease, not the lubricant, which has the properties recited in claim 1.

In view of the claim amendments, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

III. THE PRIOR ART REJECTION

The Examiner alleges that Okaniwa would have been combined with Tanaka to teach the claimed invention of claims 1-5. Applicants respectfully submit, however, that these references, even if combined, would not teach or suggest each and every feature of the claimed invention.

That is, Applicants submit that neither Okaniwa nor Tanaka is even related to, let alone teaches or suggests, an electric power steering device. Tanaka is merely directed to a lubricant composition and its use in a ball joint. Okaniwa is merely directed to a grease composition for steering motor cars. Neither Okaniwa nor Tanaka teaches an electric power steering device, let alone an electric power steering device for transmitting a rotation of a motor for assisting operation of steering which is reduced via a reduction gear to a steering mechanism, where the steering device includes a male type joint member and a female type joint member jointed to each other for transmitting the rotation of the motor to the reduction gear, as recited in exemplary claim 1. Indeed, the Examiner has ignored these features of the claimed invention and has merely provided references that are directed to the claim limitation of a lubricant.

Furthermore, neither Okaniwa nor Tanaka, nor any combination thereof, teaches or suggests an electric power steering device “*a lubricant including a grease, a base oil of said grease having a kinetic viscosity of 1000 to 5000 mm²/s at 40°C, a worked penetration of which is not more than 300*” as recited in claim 1.

The Examiner alleges that Okaniwa discloses the recited elements of the claimed invention. The Examiner, however, is clearly incorrect.

That is, nowhere does Okaniwa teach or suggest a lubricant including a grease, a base oil of the grease having a kinetic viscosity of 1000 to 5000 mm²/s at 40°C. Indeed, nowhere does Okaniwa even mention a kinetic viscosity range, let alone teach or suggest the specific range recited in claim 1.

In Table 1 of Okaniwa (see Okaniwa at column 6), the kinetic viscosity is provided for Examples 1-5. The kinetic viscosity of Examples 1-5 is 30.0, 11.6, 31.0, 18.0 and 18.0 mm²/s at 40°C, respectively. Each of these kinetic viscosities is clearly outside of the specific range recited in exemplary claim 1.

In conventional electric steering devices grease of low viscosity (i.e., 100 to 300 mm²/s at 40°C) is commonly charged into the engagement portion of the joint members. However, when low viscosity grease is used, gear noise is generated in the engagement portion (see Application at page 1, line 17 through page 2, line 4). The kinetic viscosities of Examples 1-5 of Okaniwa are even significantly lower than the “low viscosity” greases described in the Background section of the Application.

Furthermore, Okaniwa does not teach or suggest a lubricant including a grease having a worked penetration of which is not more than 300. Indeed, the Examiner concedes that Okaniwa “does not disclose worked penetration of the lubricant” (see Office Action dated

August 17, 2005 at page 2, numbered paragraph 2).

The Examiner alleges that Tanaka teaches the worked penetration characteristic of the claimed invention. The Examiner attempts to rely on the third full paragraph of column 4 of Tanaka to support her allegations. The Examiner, however, is clearly incorrect.

That is, nowhere does Tanaka teach or suggest an electric steering device including a grease having a worked penetration of which is not more than 300. Indeed, Tanaka teaches that the worked penetration of the grease may be up to 340 (see Tanaka at column 4, lines 21-32).

The M.P.E.P. states that “[i]n order to anticipate the claims, the claimed subject matter must be disclosed in the reference with ‘sufficient specificity to constitute an anticipation under the statute’” (see M.P.E.P. § 2131.03). For instance, “[i]f the claims are directed to a narrow range, the reference teaches a broad range, and there is evidence of unexpected results with the claimed narrow range, depending on the other facts of the case, it may be reasonable to conclude that the narrow range is not disclosed with ‘sufficient specificity’ to constitute an anticipation of the claims” (see M.P.E.P. § 2131.03).

Tanaka teaches that the worked penetration is in a range of 220 to 340. The claimed invention, however, recites that the worked penetration is not more than 300. The Application explains that if the worked penetration exceeds 300 the viscosity of the lubricant is too high and therefore the working property of assembling is deteriorated (see Application at page 14, lines 4-10). In stark contrast, Tanaka clearly teaches lubricants having a worked penetration of higher than 300.

Additionally, Applicants point out that the Examiner is comparing the dynamic viscosity values of Tanaka (cp) with the kinetic viscosity range in the claimed invention.

(mm/s²). In addition, the viscosity values relied upon by the Examiner are those of polyisoprene rubber and not those of a base oil as in the claimed invention.

Thus, Tanaka fails to make-up the deficiencies of the Okaniwa.

Moreover, Okaniwa discloses grease used in a rack pinion and hypoid gears of a pinion assist type electric power steering apparatus. Tanaka discloses grease used between a ball seat of syntethetic resin and a metal ball stat. None of the references discloses a grease charged between a male type joint member and a female type joint member that transmits the rotation of a motor to a reduction gear of an electric power steering device. Generally, a person skilled in the art would select grease in accordance with the used portion and use environment because the required characteristics of the grease depend on the used portion and the use environment.

Thus, a person of ordinary skill in the art would not look in Okaniwa and Tanaka to solve the problem because the required characteristics of the grease disclosed in Okaniwa and Tanaka and the required characteristics of the grease according to the present invention are completely different from one another.

Therefore, Applicants submit that, even if combined, the alleged combination would not teach or suggest each and every feature of the claimed invention. Therefore, the Examiner is respectfully requested to reconsider and withdraw this rejection.

IV. NEW CLAIMS

New claims 6-15 have been added to provide more varied protection for the claimed invention and to claim additional features of the invention. These claims are independently patentable because of the novel features recited therein.

Applicants respectfully submit that new claims 6-15 are patentable over any combination of the applied references at least for analogous reasons to those set forth above with respect to claims 1-5.

V. FORMAL MATTERS AND CONCLUSION

Applicants respectfully request the Examiner to acknowledge Applicants' claim to foreign priority, which was made on March 10, 2004.

In view of the foregoing, Applicants submit that claims 1-15, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

U.S. Application No. 10/796,301
Docket No. K06-167785M/TBS
(NGB.376)

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The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

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Respectfully Submitted,



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